US006011536A

[11] Patent Number: 6,011,536

[45] Date of Patent: Jan. 4, 2000

[54] METHOD AND SYSTEM FOR GENERATING AN IMAGE HAVING A HAND-PAINTED APPEARANCE

[75] Inventors: **Aaron P. Hertzmann; Kenneth Perlin,** both of New York, N.Y.

[73] Assignee: **New York University,** New York, N.Y.

[21] Appl. No.: **09/083,401**

[22] Filed: **May 22, 1998**

Related U.S. Application Data

[60] Provisional application No. 60/082,245, Apr. 17, 1998.

[51] Int. Cl.[7] **G09G 5/00**
[52] U.S. Cl. **345/112; 345/156**
[58] Field of Search 345/112, 156, 345/419, 431

[56] **References Cited**

U.S. PATENT DOCUMENTS

4,633,416	12/1986	Walker	345/156
4,956,872	9/1990	Kimura .	
5,038,223	8/1991	Yamada .	
5,063,448	11/1991	Jaffray et al. .	
5,276,786	1/1994	Long et al.	345/428
5,301,136	4/1994	McMillan, Jr. et al. .	
5,384,912	1/1995	Ogrinc et al.	345/523
5,412,767	5/1995	Long .	
5,500,925	3/1996	Tolson .	
5,621,868	4/1997	Mizutani et al. .	
5,687,304	11/1997	Kiss .	

OTHER PUBLICATIONS

"Multiresolution Painting and Compositing", Deborah F. Berman, Jason T. Bartell, David H. Salesin, SIGGRAPH 94 Conference Proceedings, pp. 85–90,Jul. 1994.

"The Further Exploits of Aaron, Painter" Harold Cohen, Stanford Humanities Review, vol. 4, No. 2.,pp. 141–158, 1995.

"Computer–Generated Watercolor", Cassidy J. Curtis, Sean E. Anderson, Joshua E. Seims, Kurt W. Fleischer, Dvid H. Salesin, SIGGRAPH 97 Conference Proceedings, pp. 421–430,Aug. 1997.

"Paint By Numbers: Abstract Image Representations", Paul Haeberli, Computer Graphics, pp. 207–214, vol. 24, No. 4, Aug. 1990.

"Expressive Rendering: A Reivew of Nonphotorealistic Techniques", John Lansdown, Simon Schofield, IEEE Computer Graphics and Applciations, 15(3):29–37, 12 pages, May 1995.

"Processing Images and Video for An Impresionist Effect", Peter Litwinowicz, SIGGRAPH 97 Conference Proceedings, pp. 407–414, Aug. 1997.

"Real–Time Nonphotorealistic Rendering", Lee Markosian, Michael A. Kowalski, Samueal J. Trychin, Lubomir D. Bourdev, Danieal Goldstein, John F. Hughes, SIGGRAPH 97 Conference Proceedings, pp. 415–420,Jul. 1997.

"Live Paint: Painting with Procedural Multiscale Textures", Ken Perlin, Computer Graphics Proceedings, Annual Conference Series, pp. 153–160,1995.
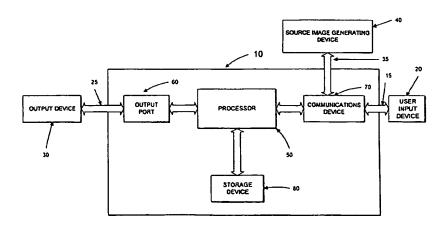
(List continued on next page.)

Primary Examiner—Richard A. Hjerpe
Assistant Examiner—Ronald Laneau
Attorney, Agent, or Firm—Kenyon & Kenyon

[57] **ABSTRACT**

A method and system receives a digital source image and brush size data. The source image is blurred to generate a digital reference image. The brush size data includes a first record corresponding to a first size of a brush and a second record corresponding to a second size of the brush. The first size is different from the second size. The method and system applies brush strokes, with the first record to be used for the brush, to a digital canvas image using the reference image. Then the brush strokes are applied, with the second record to be used for the brush, to the canvas image using the reference and working images. Thus, a final digital image having a hand-painted appearance is generated on the canvas image. Long curved brush strokes can also be used to generate the target image, which is aligned in a normal direction to image gradients. Furthermore the graphic artist may adjust parameters of the method and system according to the present invention to vary the style of painting.

28 Claims, 10 Drawing Sheets